

## Claims

1   **Claim 1.** A vacuum ring for use in conjunction with a test plate on a  
2   component testing system, the vacuum ring comprising:

3         a metallic base material that defines at least one  
4   vacuum-communicating passageway, the metallic base material having  
5   a test-plate-facing first surface; and

6         means for improving abrasion resistance of the vacuum ring,  
7   including a ceramic layer disposed on the test-plate-facing first surface  
8   of the metallic base material.

1   **Claim 2.** A vacuum ring as recited in claim 1, wherein the metallic  
2   base material is at least partially composed of aluminum and the  
3   ceramic layer is composed of alumina.

1   **Claim 3.** A vacuum ring as recited in claim 1, wherein the ceramic  
2   layer is no less than about 20 micrometers thick.

1    **Claim 4.**   A vacuum ring as recited in claim 1, wherein the ceramic  
2    layer is no greater than about 100 micrometers thick.

1    **Claim 5.**   A vacuum ring as recited in claim 1, wherein the ceramic  
2    layer is bonded to the metallic base material by molecular adhesion.

1    **Claim 6.**   A vacuum ring as recited in claim 1, wherein the ceramic  
2    layer is formed on the metallic base material by a micro-arc oxidation  
3    process.

1   **Claim 7.** A test plate for holding DUTs, comprising:  
2           a DUT-holding structure that defines at least one DUT-receiving  
3   hole, said DUT-holding structure being composed at least partially of a  
4   metallic material that has oppositely facing first and second outer  
5   surfaces; and  
6           means for improving abrasion resistance of the test plate,  
7   including a ceramic layer disposed on at least the first outer surface of  
8   the DUT-holding structure.

1   **Claim 8.** A test plate as recited in claim 7, wherein the DUT-holding  
2   structure is at least partially composed of aluminum and the ceramic  
3   layer is composed of alumina.

1   **Claim 9.** A test plate as recited in claim 7, wherein the ceramic layer  
2   is no less than about 20 micrometers thick.

1   **Claim 10.** A test plate as recited in claim 7, wherein the ceramic layer  
2   is no greater than about 100 micrometers thick.

1   **Claim 11.** A test plate as recited in claim 7, wherein the ceramic layer  
2   is bonded to the DUT-holding structure by molecular adhesion.

1   **Claim 12.** A test plate as recited in claim 7, wherein the ceramic layer  
2   is formed on the DUT-holding structure by a micro-arc oxidation  
3   process.

1   **Claim 13.** A test plate as recited in claim 7, wherein the DUT-holding  
2   structure includes an internal wall that defines the DUT-holding hole  
3   and the ceramic layer covers the internal wall.

1   **Claim 14.** A test plate as recited in claim 7, wherein the ceramic layer  
2   covers both the first and second surfaces and the internal wall in order  
3   to enable use of the DUT-holding structure as a guard layer that is held  
4   at a selected electrical potential for testing purposes.

1    **Claim 15.** A vacuum ring for use in conjunction with a test plate on a  
2    component testing system for testing DUTs such that each DUT has a  
3    cross sectional area less than a predetermined minimum cross  
4    sectional area, the vacuum ring comprising:

5           a base; and

6           means for ejecting DUTs from the test plate, said means  
7    including an eject hole pattern defined by the base for discharging  
8    compressed gas toward the DUTs;

9           wherein the eject hole pattern includes a plurality of closely  
10   spaced apart individual holes such that each of the individual holes has  
11   a cross sectional area that is less than the size that would be large  
12   enough to receive a DUT having the predetermined minimum cross  
13   sectional area;

14          whereby the number of holes affecting a particular DUT for DUT  
15   ejection purposes is dependent on the cross sectional size of that  
16   particular DUT.

1    **Claim 16.** A vacuum ring as recited in claim 15, wherein the holes  
2    have uniform circular shapes with diameters of about five mils.

1    **Claim 17.** A vacuum ring as recited in claim 15, further comprising a  
2    ceramic layer on the base.